Spring 2015

The Quarterly Hail

National Weather Service - Hastings, Nebraska

Volume 5, Issue 1

Notes From the Meteorologist In Charge

I want to begin this article with a big thanks to all our volunteers. Without you, we wouldn't be able to do our job nearly as well as we do. People assume since we are the National Weather Service that we are controlling the weather or have some magical eye that knows what happened everywhere. The fact of the matter is we have no more control over the weather than you do and without you and your reports, we wouldn't know half of what is going on out there.

Our relationship with our volunteers is held up as one of the best examples of a successful partnership between government and citizens anywhere in the world! So here's to you. For every observation you take and every report you send in, we thank you!

We are heading into the spring season and with spring comes change. Sometimes change offers us a challenge that we must overcome. Spring always presents the threat of being the most challenging in terms of swings in temperature and precipitation type. Because of its potential, it is also the most threatening to our lives and property. Please be "Weather Ready" or in other words, alert to the coming changes in weather and prepared to deal with those changes to stay safe in your everyday life.

We also have a big change coming to our office. We are losing one very highly valued employee, Carol Cartier, in February. She has accepted a job in Duluth, MN. Carol moved to Hastings in 2008 and brought a tremendous level of customer service and knowledge to the position she held. You may not have known Carol or talked to her on the phone because she is not a forecaster, but she held a very critical support position to the forecasters. She kept all the software systems operating at peak efficiency so the forecasters could issue warnings and forecasts. We wish her the best of luck in her new job and will miss her very much! We will find ways to fill her job duties, but will not be able to fill the void she will leave as a person.

In closing, please stay alert and prepared for the weather changes inevitably headed your way over the next few months. Thank you so much for all you do!

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Inside this issue:

Special Points of Interest:

- *Learn more about the upcoming 80th Anniversary of the Republican River Flood.*
- *Do you know the wettest spring month on record?*
- *How do tornadoes form?*
- *There is a new way Doppler Radar scans the sky!*
- *Severe Weather Awareness Week is coming soon!*

2015 Spring Severe Weather Awareness Presentations

All presentations begin at 6:30 p.m.

Date	County	City	Location
February 23	Thayer	Hebron	District Courtroom, 3rd Floor Thayer County Courthouse
February 24	York	York	4-H Building York County Fairgrounds
February 25	Adams	Hastings	Lincoln Park Fire Station
February 26	Nance	Genoa	Community Room 313 Willard Avenue
March 2	Smith	Smith Center, KS	Church of Nazarene
March 2	Osborne	Osborne, KS	Osborne Public Library
March 3	Rooks	Stockton, KS	City Hall
March 4	Phillips	Phillipsburg, KS	Fischer Building, Basement
March 4	Mitchell	Beloit, KS	NCK Technical College
March 5	Valley	North Loup	Fire Station
March 9	Greeley	Spalding	Fire Station
March 10	Polk	Osceola	Fire Station
March 10	Fillmore	Geneva	Public Library, Basement
March 11	Hall	Grand Island	City Hall - Council Chambers
March 12	Nuckolls	Ruskin	Community Building
March 16	Hamilton	Aurora	Fire Station
March 16	Franklin	Hildreth, NE	Fire Station
March 17	Howard	St. Libory	Fire Station
March 18	Dawson	Gothenburg	Fire Station

2015 Spring Severe Weather Awareness Presentations

All presentations begin at 6:30 p.m.

Date	County	City	Location
March 23	Sherman	Loup City	Community Center
March 24	Furnas	Oxford	Fire Station
March 24	Clay	Clay Center	Clay County Fairgrounds
March 25	Phelps	Loomis	Community Building
March 25	Kearney	Axtell	Fire Station
March 26	Buffalo	Kearney	Buffalo County Fairgrounds Extension Building
March 26	Gosper	Elwood	Fire Station
March 30	Jewell	Mankato, KS	Community Center
March 30	Webster	Guide Rock	Fire Station
March 30	Harlan	Alma	Johnson Center/Fire Station
March 31	Merrick	Central City	Fire Station

Severe Weather Awareness Week & Tornado Safety Drill

We have a bit of winter yet to go, but it's never too early to look ahead to the upcoming severe weather season! Do you know what to do in the case of threatening weather? Severe Weather Awareness Week presents the opportunity to get your plan in place. Be checking out our website and social media pages as we approach Kansas and Nebraska's weeks for more information!

Kansas: March 2nd - 6th **Nebraska: March 23rd - 27th**

Every year, each state conducts a statewide tornado safety drill. These drills are designed to imitate the event of a real tornado. Make sure that you have a plan and practice where you would go in the event of a tornado. The following tornado drills have been scheduled in Nebraska and Kansas:

Kansas: Tuesday, March 3rd, 2015 at 1:30 pm CST.

Nebraska: Wednesday, March 25th, 2015 between 10 am and 11 am CDT.

Tips For Reporting Hail and Wind Speed

The National Weather Service will issue a Severe Thunderstorm Warning when hail is expected to be 1" (quarter size) or larger and/or when winds are expected to be 58 MPH or greater. When reporting hail, it is best to measure the hail when safe to do so. If you are not equipped with a ruler or other measuring instrument, hail size can be related loosely to coins or athletic balls, as in the table below (right).

It's often difficult to estimate wind speed, especially in the plains where there are few physical indicators to observe damage. Below (left) is the Beaufort Wind Force Scale for estimating wind speeds. This is only a rough guide. Actual damage may occur at weaker or stronger speeds.

Wind Speed (mph)	Effects
25-31	Large branches in motion
32-38	Whole trees in motion
39-54	Twigs break off trees, wind impedes walking
55-72	Damage to TV antennas, large branches break off trees
73-112	Surfaces of roofs peeled off, windows broken, trailer homes overturned
113+	Roofs blown from houses, weak buildings and trailer homes destroyed, large trees uprooted, train cars blown off tracks

BB	Less than 1/4"
Pea	1/4"
Dime	7/10"
Penny	3/4"
Nickel	7/8"
Quarter	1"
Half Dollar	1¼"
Walnut or Ping-Pong Ball	1½"
Golf Ball	1¾"
Lime	2"
Tennis Ball	2½"
Baseball	2¾"
Large Apple	3"
Softball	4"
Grapefruit	4½"

80th Anniversary of The Republican River Flood

Main Street in Cambridge, NE.
Photo courtesy of the Clinton John Collection.

The mid 1930s are known as the Dust Bowl Years. Several years of dry conditions and warm temperatures brought a severe drought to the area with dust storms across much of the plains. Not every location was dry, nor was it dry all of the time.

May of 1935 was an exception to the drought for parts of southwestern Nebraska and northwestern Kansas. For the month of May 1935, Grand Island had 10.43" of rain, Greeley, Nebraska, 6.71" and Burr Oak, Kansas, had 8.16". Not bad for the middle of drought.

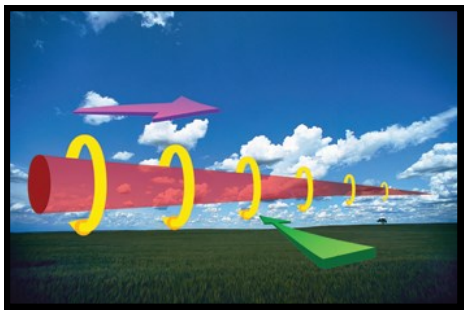
On May 30th, torrential rainfall occurred in eastern Colorado and southwest Nebraska. Rainfall amounts of more than three inches were common, with localized amounts of upwards of seven inches. By the early morning hours of May 31st, water was moving rapidly down the Republican River Valley.

On May 31st the water reached Benkleman around 7 a.m., McCook around 1 p.m., and Cambridge around 7 p.m. On June 1st the water reached Alma around 4 a.m. and Red Cloud around 4 p.m. Near Orleans the water was running "bluff to bluff". In McCook, it was reported that as the flood was moving through there was a dust storm at the same time.

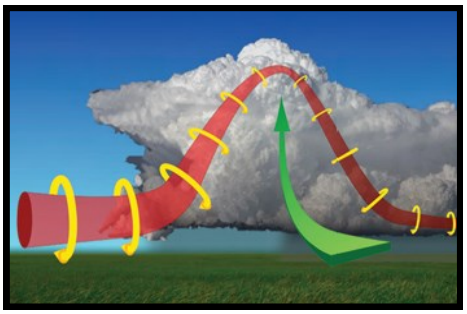
The flood was devastating. There were 110 deaths attributed to the flooding, over 20,000 livestock were killed, 830 miles of highways were damaged and over a quarter of a million acres of farmland was damaged. To alleviate future flooding, several dams were put in to help control the flow of water.

A more detailed story can be found at **http://www.crh.noaa.gov/gld/?n=1935flood**

How Do Tornadoes Form?



Before thunderstorms develop, winds change direction and increase in speed with altitude. This creates an invisible, horizontal spinning effect in the lower atmosphere.



Rising air within the thunderstorm updraft tilts the rotating air from horizontal to vertical.

An area of rotation, 2-6 miles wide, now extends through much of the storm. Most tornadoes form within this area of strong rotation.

More information can be found at:

http://www.nws.noaa.gov/os/brochures/SGJune6-11.pdf

Weak Tornadoes

- 88% of all tornadoes
- Less than 5% of tornado deaths
- Lifetime 1 – 10+ minutes
- Winds less than 110 mph
- Produces EF0 or EF1 damage

Photo courtesy of Chuck Doswell II

Strong Tornadoes

- 11% of all tornadoes
- Near 30% of all tornado deaths
- May last 20 minutes or longer
- Winds 111-165 mph
- Produces EF2 or EF3 damage

Photo courtesy of Wikimedia/Justin Hobson

Violent Tornadoes

- Less than 1% of all tornadoes
- 70% of all tornado deaths
- Can exceed 1 hour
- Winds greater than 166 mph
- Produces EF4 or EF5 damage

Photo courtesy of Wikimedia/Joshua Jans

More information on the EF-scale can be found at:

http://www.spc.noaa.gov/efscale/

Product Highlight - Changes to Day 1, 2, 3 Outlooks from SPC

How are the outlooks changing for Day 1, Day 2 and Day 3?

The SPC has revised Day 1 through Day 3 categorical severe weather outlooks to better communicate risk and describe the likelihood of severe weather. Format changes also improve the use of SPC severe weather forecasts for customers who incorporate SPC outlooks into GIS systems.

The SPC has expanded the risk categories from four to five and clarified the risk previously labeled as "See Text". That descriptor is replaced by a categorical line and the term "Marginal" to denote areas with a 5% probability of severe weather. The upper end of the "Slight Risk" category is renamed "Enhanced" (short for "Enhanced Slight") to denote a threshold 30% probability of severe wind or hail and/or a 10% chance of a tornado during the Day 1 period. For Days 2 and 3, the "Enhanced" risk category denotes a 30% total severe probability. The Moderate and High risk thresholds will remain essentially unchanged.

Previous:

1. See Text
2. Slight (SLGT)
3. Moderate (MDT)
4. High (HIGH)

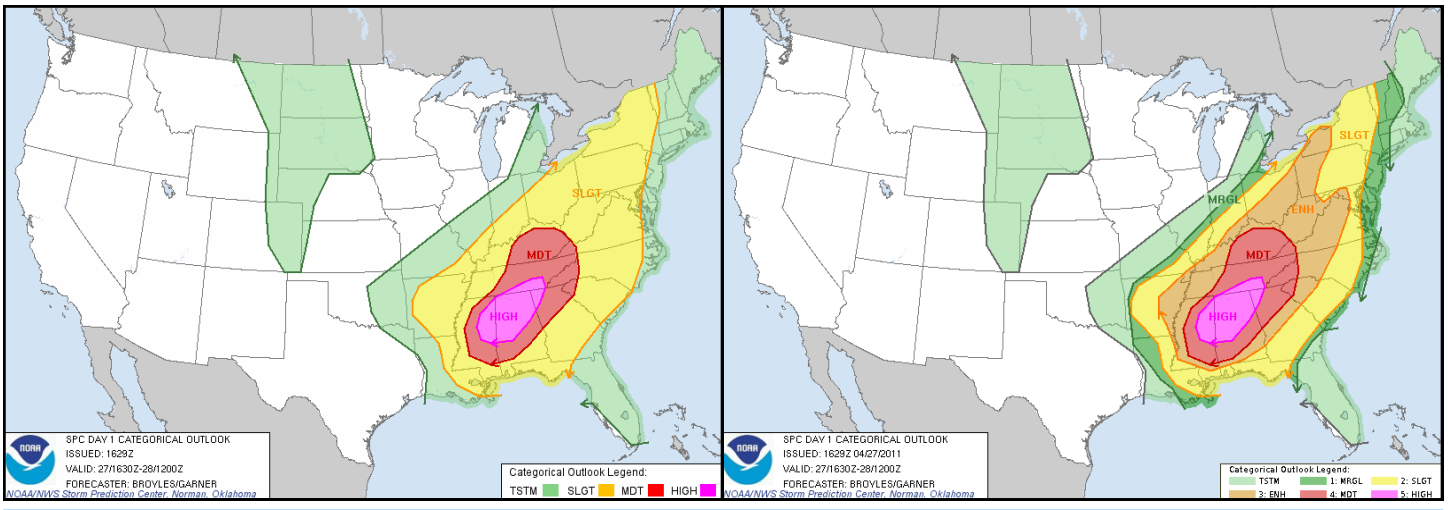
New:

1. Marginal (MRGL) - replaces the previous SEE TEXT and now is described with Categorical line.
2. Slight (SLGT)
3. Enhanced (ENH) - replaces upper-end SLGT risk probabilities, but is not a MDT risk
4. Moderate (MDT)
5. High (HIGH)

Why is the SPC doing this?

A primary goal of these changes is to bring better consistency to the risks communicated in SPC outlooks, from the short-range Day 1 outlooks through the extended range Day 4-8 outlooks. The changes have been made based on customer feedback and to better meet their needs. In addition, "See Text" did not convey a threat area, due to the lack of a contour in any "See Text" categorical forecast. And the previous "Slight Risk" category covered too broad a range of severe weather probability values.

More detailed information can be found here: **http://www.spc.noaa.gov/exper/dy1-3example/**



Celebrating Marla's 40 Years of Service! Continued from Winter 2014 Newsletter

During her time at the Omaha office, she was able to visit family as they lived in northeast Nebraska and south central South Dakota. Unfortunately, the rotating shiftwork involved many weekends which didn't allow for a lot of visits. They also took a toll on time with her sons as it seemed the babysitter saw them more than she did. So when Eastern Region Human Resources called one day and asked if she would be interested in taking her old position at the Youngstown office, she decided to take them up on it. They needed someone that could walk in the door and start working immediately, without any training, and she wanted more family time, so after 2 fun years (1986-1988) at the Omaha office, off they went back to Ohio. It was nice in that they had moved the trailer house to Nebraska from Ohio, now they could move their home back to Ohio. Made moving a bit easier to handle.

Not much had changed at the Youngstown office, other than one of the staff members having retired, so it was quite easy to just fit back in. Living across the street from the airport made it rather convenient, no long commute. In fact, many times she just walked to work, sometimes just to have coffee and visit with everyone after the school bus picked up the boys. Then the rumbles started about the possibility of offices closing as the NWS was talking about modernizing due to changes in technology. Of course they all started wondering what would happen to their office and all the other offices. However, the talk quieted down. In 1991 the Area Manager of Ohio asked if she would be interested in a managerial position that was opening up in Mansfield, Ohio. Back then, most of the time when you wanted to move up, you had to move to another office, it was very rare that you were promoted on-station. While she really wasn't interested in management, she felt she was more of the worker-bee type, she knew it would give her more time with Jeremy and Matthew as the office there was considered part-time as it was only open from 6 AM to 6 PM unless there was severe weather. After talking it over with the boys, they decided it would be a good idea to bid on the job. There were no guarantees' of being selected as it was competitive. As it turned out, she was selected, so in the summer of 1991 they moved to Mansfield. The office there was located at a small airport with only 2 other people in the office. The duties here involved taking observations, recording them every hour, along with the forecast so the public could call in and get the information. They were responsible for 5 counties around the area. The radar image was linked to the radar in Akron, Ohio. All the maps were still printed on a difax machine and posted on a wall for display. While air traffic was limited as there were no commercial flights, pilots would come in from time to time for a weather briefing. An Air National Guard base was also located adjacent to the airport along with an air traffic control tower. They had a basketball hoop set up in the parking lot so guess what we got to do on breaks or after work. A little tough in high heels but heck, the guys cut me some slack.

Mansfield is located on the northern edge of Mohican State Park, so they had a lot of fun exploring the area. Great trail for pretending to be whatever you wanted to be. The boys always pretended they were on 4-wheelers. They moved into a duplex this time, no more moving the trailer. Hopefully, this would be the last move they would have to make as changing schools and making new friends was getting old. The Area Manager had said they should be able to stay there long enough for the boys to get through school. For the first time in her career she was able to attend virtually all school events, football games and practices, and have most weekends off. It was a nice change for the family.

While it was a small airport and a small office, it was rather busy at times as aircraft could get in and out rather quickly and the runways were rather long. In fact, a Russian transport plane arrived one day with parts destined for NASA in Cleveland, Ohio. This plane happened to be the largest transport plane in the world so it drew quite a crowd.

Six months into their stay at Mansfield, the Area Manager mentioned she might want to keep her eye on jobs opening up due to the modernization the weather service was gearing up for as it was possible many of the smaller offices would be closed, but he couldn't say when this might happen. This was rather disheartening as they had planned on staying where they were. Now, do you take a chance and stay, hoping the office doesn't close or do you bid on locations you were willing to go when the jobs came open?

Celebrating Marla's 40 Years of Service! Continued from Winter 2014 Newsletter

As it turned out, when the new position of Data Acquisition Program Manager for Hastings, NE was announced in August of 1993, her family back in Nebraska urged her to bid on it, so she did. Months and months went by, hearing nothing she thought, "I must really be bad, I didn't even make the panel"! But then she was interviewed for the position and was actually selected. Marla, Jeremy and Matthew ended up moving once again, this time over the Christmas holidays, arriving at Hastings on January 2nd, 1994. This time, they were going to stay until the boys graduated so they bought a house and moved in on Valentine's Day.

While most of the offices she had been assigned to were located at airports, this one was north of town, right next to a cornfield and the highway. Which meant you would not be having pilots stopping by for a briefing or passengers wandering in to take a look around. But you did have the occasional deer outside the window and plenty of bunnies and squirrels.

At this time they were running two offices as the one in Grand Island was still open, however, it was in the spin down phase while Hastings was spinning up. They were also responsible for 30 counties across south central Nebraska and north central Kansas. Both offices were open 24 hours a day so there were times when you might work in Hastings one day and Grand Island the next. In Grand Island we were phasing out the old technology while at Hastings it was time to break in some of the new. We were still using AFOS but now the new WSR-88D Nexrad radar was the new kid on the block. What a change that was, along with ASOS (Automated Surface Observing System). This platform of equipment was designed to replace the human observer. No more taking manual observations every hour or when certain weather criteria was met. How sad, Marla really enjoyed keeping a constant weather watch and taking observations. A great deal of pride was taken in keeping the forecasters up-to-date on what was actually happening "outside" the window. The only manual observation the office did now was every six hours they recorded the cloud cover and the amount of any precipitation that fell, including snowfall and snow depth. Since they were automatically considered a cooperative observing station, they also took 24 hour max/min/precipitation reports. They also had an evaporation pan so readings were taken from it every morning between April and November. One familiar piece of equipment was the NOAA Weather Radio with its old 8 track tape decks. During very active severe weather events, you could spend hours in the recording room sending and recording warnings and statements. The only interaction you might have with the staff was sticking your hand out the door for the next product.

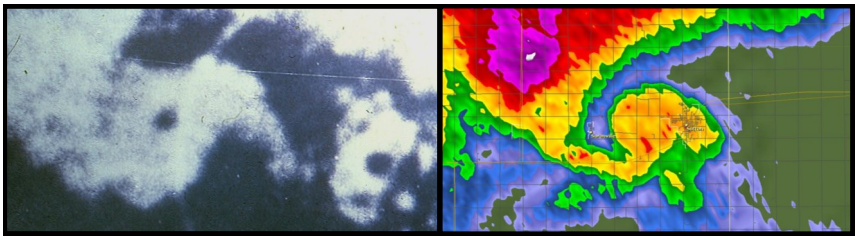


Image (left) from "old" NWS Radar during the Grand Island tornadoes of June 3, 1980. Image (right) from WSR-88D of the May 11, 2014 tornado near Sutton, Nebraska.

Since this was a new position in the NWS, a lot of the new programs were not well defined so it was an opportunity to make them her own. Marla was in charge of managing a data collection unit that had 5 other people assigned to it. Over time she managed to stumble her way through them and make sense of it all. This office was quite the challenge: working at two different offices with different equipment; learning new technology; back to working rotating shifts and raising twin boys headed into the teenage years. No wonder she has so much silver hair :).

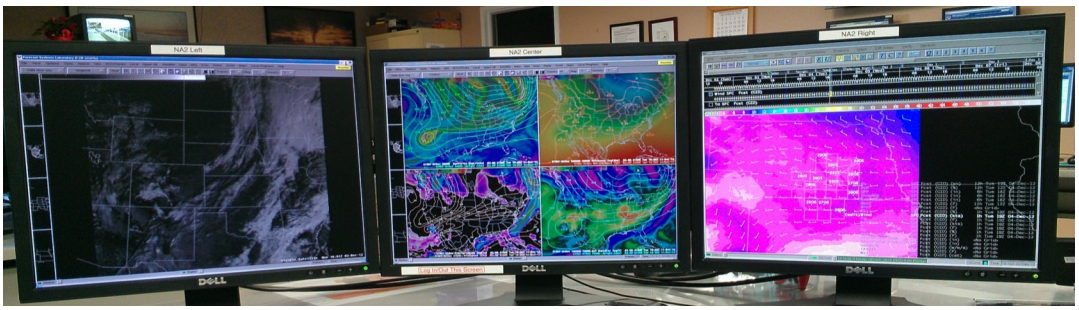
One of the new programs happened to be the Cooperative Weather Observer program. While she had heard of it, the program had previously been managed by one person responsible for the entire state. This program consisted of people volunteering their time each day to record temperatures and/or precipitation. Most of them would call in their reports to the office whenever they had precipitation and mail their form at the end of each month. Some also had a gauge that recorded precipitation on punch tapes. Others would use a special pad connected to their phone to send encoded reports.

Celebrating Marla's 40 Years of Service! Continued from Winter 2014 Newsletter

Traveling around to visit with the observers and check their equipment ended up being one of the best parts of the job. While most of this equipment has not changed over the years, the reporting methods have. Very few observers call in any more as they report online using a website (WxCoder) or over the phone using a voice activated program called IV-ROCS. The old punch tapes are gone, oh darn. They have been replaced with a digital data logger where the information is downloaded onto a sd card and mailed or emailed in to the office. She developed a lot of friendships over the years.

As the Hastings office continued to spin-up, adding more forecasters and electronic technicians, the Grand Island office eventually closed. The pace steadied for awhile, until the NWS decided to add an Information Technology Officer. They did this by using one of the vacancies in the data collection unit. So now they were down to 4 in addition to Marla, so they cut the midnight shift (oh darn) and went to days and evenings.

Included in the office spin-up was the transition from AFOS to AWIPS (Advanced Weather Interactive Processing System). Now that was something! While you were only able to overlay 3 maps on AFOS, suddenly you could overlay so many different features that it looked like a ball of yarn, plus, it was in color!! Many different colors!! Each monitor could show a total of 16 different displays. There were 3 graphics monitors and 1 text monitor. This system also did away with the old radar display as it was incorporated into AWIPS. Everything was at your fingertips. We went from 3 work stations to 6 with multiple monitors.



AWIPS workstation display of satellite image (l), model data (m) and forecast data (r)

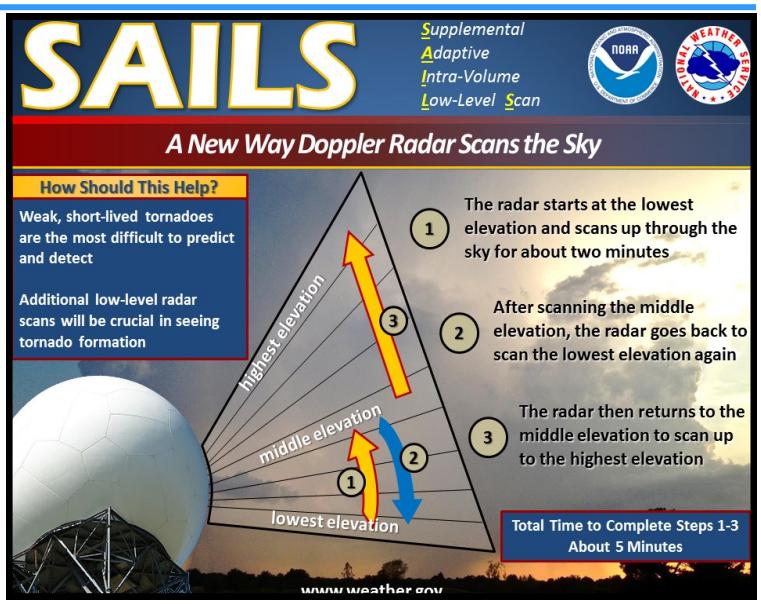
On the home front, Marla had the challenging task of raising teenage boys, yikes, what a time that was. But there were good times. While she taught them to how to change oil, spark plugs, valve cover gaskets and alternators in cars, Matthew taught her how to change brake pads. A job was considered well done when it worked after you put it back together and you didn't break a fingernail doing it. All 3 of them actually survived the teenage years and still talk to each other and she also has a granddaughter to spoil now Ahhh, paybacks are great!

Her plan was to try and transfer to another office after her sons graduated in 1999, as she liked seeing different places. Unfortunately, the NWS decided to eliminate her position. She could keep it as long as she stayed in Hastings, but if she went somewhere else it would be a different position at less pay. Darn, now what. Time to find stuff to keep busy; so she took up kick-boxing, long distance cycling, dabbled in painting, and putting together puzzles. She had her dog and 2 cats to keep her company at home.

While doing a tower inspection at Grand Island in 1997 she met the tower chief. Seemed like a nice guy, took him 10 years to ask her out! Marla can be quite intimidating you know. Must have scared him good. Now they have been together almost 8 years and she rides motorcycles with him. From farm kid in South Dakota to diesel mechanic to weather observer to biker chick. Who would have guessed. She has now been at the Hastings weather office for 21 years, longer than anywhere her entire life, sure went by fast. It was rather easy though as the people have always been wonderful to work with and they were changing all the time. An extended family of sorts. And she still thinks she has the best job in the office! What will the next adventure be? **And now you know the rest of the story...**

A New Way Doppler Radar Scans The Sky

A new software upgrade has been installed at the NWS Hastings WSR-88D that will enable the radar to obtain low level scans more frequently in severe weather events. Previously, the WSR-88D scanned the atmosphere at progressively higher angles to create a 3D profile of a storm. These scans would begin at 0.5 degrees above the horizon (the lowest angle possible) and end at a maximum angle of 19.5 degrees. These scans form what is known as a Volume Coverage Pattern, or VCP. This maximum angle can vary depending on the distance the storms are from the radar. Last year, a feature called AVSET (Automatic Volume Scan Elevation Termination) was installed that allows the radar to automatically restart a VCP if the radar beam travels above the storms.



With this latest upgrade, a new feature called SAILS (Supplemental Adaptive Intra-Volume Low-Level Scan) will enable the radar to insert an additional 0.5 degree scan in the middle of its scanning sequence, then resume where it left off. This will result in a new low level scan approximately every 2 minutes.

Why is this Important?

When it comes to severe weather, frequent low-level radar scans are crucial to observe the development of tornadoes, which can form in a matter of seconds. With SAILS, the NWS will be able to observe rapidly changing weather phenomenon with a greater degree of precision and issue more timely warnings. Currently, the WSR-88D radar completes its lowest scan in 3 to 4.5 minutes (during severe weather), depending on the range of the storms from the radar (AVSET). With SAILS, the radar will now perform this low-level scan every 1.8 to 2.5 minutes, giving us low-level data almost twice as fast as before.

Cooperative Observer Goodbyes and Hellos

Goodbye: Lawrence Wohleb of Naponee, Nebraska. Lawrence was the precipitation/river observer from February 1, 1952 to July 27, 2006, when Deidra Werner took over the precipitation duty. Lawrence continued to serve as honorary backup observer until he passed away on December 6, 2014. An awesome total of 62 years!! Anyone lucky enough to know this great gentleman can attest to his wonderful sense of humor. We always enjoyed visiting with him and his wife, Viola. He will be sadly missed.

Goodbye: Lynn Wilton of 4 E Superior, Nebraska. Lynn took over the temperature/precipitation observing duties on August 2, 2004 after longtime observer, Walter Groves passed away. Lynn recently married a gentleman from a nearby town so she is leaving the Cooperative Observer family. For many years Lynn raised beautiful Norwegian Elkhounds.

Goodbye: Craig and Genie Ingram of Long Island 1N, Kansas. Craig and Genie have been the precipitation observers since November 15, 2006 until January 1, 2015. Farming/ranching/family takes a great deal of time and energy. With so many irons in the fire, something had to give.

Goodbye: Charlotte Hanson of Jewell, Kansas. Charlotte has been the precipitation observer from February 25, 1988 until February 1, 2015. Over 25 years of reporting for her. You never knew what you would encounter at Charlotte's. Could be kittens or puppies, or both!!

Cooperative Observer Goodbyes and Hellos continued...

Goodbye: Gene Deiter of Hunter, Kansas. Gene was the precipitation observer from June 25, 2004 until November 2014. He is quite the character around town. We wish him well in his retirement.

We want to thank all of our observers for their many years of sacrifice in making time to properly record and measure the weather for their area.

After all those goodbyes - we do have one new observer!!

Welcome: Rick Disney of Superior, Nebraska. Rick has a long history of providing weather information, including his own personal weather station at rickdisney.net. William Blauvelt will serve as backup observer.

As you may have guessed, we are actively seeking replacement observers. So if any of you happen to know of someone near these locations, please give us a call. Put the word out for the next Weather Hero!!

Employee Spotlight - Steve Eddy, Meteorologist-In-Charge

I have been in transition and a growing fan of various people and organizations all of my life. I was born in Naperville, IL (suburb of Chicago) in a blizzard in 1962. I can't help being a Bears and Cubs fan with that connection. When I was 5, my family moved to Iroquois, Ontario, Canada, eh? I enjoyed playing hockey and being outside as a boy. While living in Canada, I became a Toronto Maple Leaf (hockey) fan, eh? When I was 13, we moved to Pekin, IL (near Peoria). I went to high school there and become a fan of girls. More accurately, the fan of one woman in particular, who was my high school sweetheart and later I wore her down enough that she agreed to marry me. After high school, I went off to college at the University of North Carolina at Asheville. There I became a huge fan of Meteorology. Also while in college, I got married to my high school sweetheart, Lynn (so I suppose you can infer I was and am a big fan of her). She put me through the remainder of college and has stuck with me for the other 32 years, 5 kids and the 5 moves that followed (so I'm still a fan).

After college, I got a job at the National Climatic Data Center in Asheville. Then, in May of 1985, I began my NWS career. To advance in a NWS career, it was required that you move from station to station. And so it goes, I worked at the following locations…Huron, SD from 1985 to 1989; Sioux Falls, SD from 1989 to 1994, Minneapolis, MN in 1992, Indianapolis, IN 1994-2001, Syracuse, IN (near Fort Wayne) 2001-2007; Hastings, NE 2007 to present. This October I will have had the honor of working 30 years in federal service. I guess you can state unequivocally, I am a fan of the mission and people that work for and with the NWS.

Lynn and I have been blessed with 5 children; 2 daughters and 3 sons. Our oldest daughter passed away when she was 10 months old, the rest are alive and prospering. My oldest son is in graduate school in Charlotte, NC studying Cognitive Studies (who knows how you make a living from studying that??). The next oldest is currently in the US Army stationed at Fort Carson, CO. My surviving daughter is a junior in high school and my youngest boy is a freshman. So, I am a fan of the U.S. Army, Adams Central High School and whatever college my oldest son is currently attending!

Away from work, I am very active in, and a huge fan of the Boy Scouts of America. The oldest 2 boys have achieved the rank of Eagle and my youngest is very close to getting his. I am active in my church. I teach an Introduction to Meteorology course at CCC Hastings in the spring every year. I am Chairman of the Local Emergency Planning Committee for Adams County and am on my community board. As a family we enjoy doing things for those less fortunate in the community, like helping at the food pantry, etc. I love attending the multitude of extracurricular events in which my children are involved, including band, choir, quiz bowl, tennis, wrestling, rugby, cross country, track and football. With the other 5 minutes I have left in the week, we enjoy being outdoors and active in community improvement projects.

How Does The Radar Work?

NEXRAD (**Nex**t Generation **Rad**ar) obtains weather information (precipitation and wind) based upon returned energy. The radar emits a burst of energy. If the energy strikes an object (rain drop, bug, bird, etc.), the energy is scattered in all directions. A small fraction of that scattered energy is directed back toward the radar. The NEXRAD for the NWS Hastings office is located near Blue Hill, NE.

This reflected signal is then received by the radar during its listening period. Computers analyze the strength of the returned pulse, time it took to travel to the object and back, and phase shift of the pulse. This process of emitting a signal, listening for any returned signal, then emitting the next signal, takes place very fast, up to around 1300 times each second.

To generate this pulse of energy we have a crystal oscillator that produces a very small low power signal. This signal is amplified and shaped to get ready to be applied to a high power amplifier tube known as a Klystron. At the same time we also produce some high voltage to turn the tube (Klystron) on and make it conduct. The Klystron tube (pictured right) then amplifies the RF energy and produces the 700 Kw output pulse. The picture to the lower left is part of our High voltage section. The part the Electronics Technician is putting in is a filter bank.

NEXRAD spends the vast amount of time "listening" for returning signals it sent. When the time of all the pulses each hour are totaled (the time the radar is actually transmitting), the radar is "on" for about 7 seconds each hour. The remaining 59 minutes and 53 seconds are spent listening for any returned signals

The ability to detect the "shift in the phase" of the pulse of energy makes NEXRAD a Doppler radar. The phase of the returning signal typically changes based upon the motion of the raindrops (or bugs, dust, etc.). This Doppler Effect was named after the Austrian physicist, Christian Doppler, who discovered it. You have most likely experienced the "Doppler effect" around trains.

As a train passes your location, you may have noticed the pitch in the train's whistle changing from high to low. As the train approaches, the sound waves that make up the whistle are compressed making the pitch higher than if the train was stationary. Likewise, as the train moves away from you, the sound waves are stretched, lowering the pitch of the whistle. The faster the train moves, the greater the change in the whistle's pitch as it passes your location.

The same effect takes place in the atmosphere as a pulse of energy from NEXRAD strikes an object and is reflected back toward the radar. The radar's computers measure the phase change of the reflected pulse of energy which then converts that change to a velocity of the object, either toward or from the radar. Information on the movement of objects either toward or away from the radar can be used to estimate the speed of the wind. This ability to "see" the wind is what enables the NWS to detect the formation of tornados which, in turn, allows us to issue tornado warnings with more advanced notice.

Various Historical Spring Extremes For The Local Area (March-May)...

	Coldest March Low Temperature On Record	Coldest April Low Temperature On Record	Coldest May Low Temperature On Record	Earliest *LAST* Spring Freeze On Record	Wettest Spring Month On Record (March-May)
Grand Island	-21° / Mar 4, 1960	-1° / April 2, 1936	22° / May 1, 1909	April 5th (32°) in 1969, 1977, 1984	11.27" / May 1903
Hastings	-15° / Mar 11, 1998	5° / April 3, 1936	22° / May 1, 1909	Mar 9, 2012 (22°)	12.47" / May 1965
Kearney	-21° / Mar 3, 1960	0° / April 2, 1936	19° / May 1, 1909	Apr 3, 1930 (30°)	10.00" / May 1935
Osceola	-20° / Mar 4, 1960	0° / April 3, 1936	21° / May 4, 1967	Mar 31, 1991 (32°)	12.34" / May 1903
Holdrege	-12° / occurred 3 times most recently Mar 4, 1978	4° / April 2-3, 1936	19° / May 1, 1909	Apr 6, 1977 (31°)	12.36" / May 1903
Alton, KS	-17° / Mar 3, 1960	8° / occurred twice Apr 7, 2009 Apr 3, 1936	19° / May 1, 1909	Apr 3, 1915 (28°)	15.22" / May 1961
Plainville, KS	-21° / Mar 11, 1948	5° / April 2, 1936	25° / May 3, 1907	Mar 10, 2012 (29°)	11.49" / May 1995

Spring Climate Outlook Detailed Below...

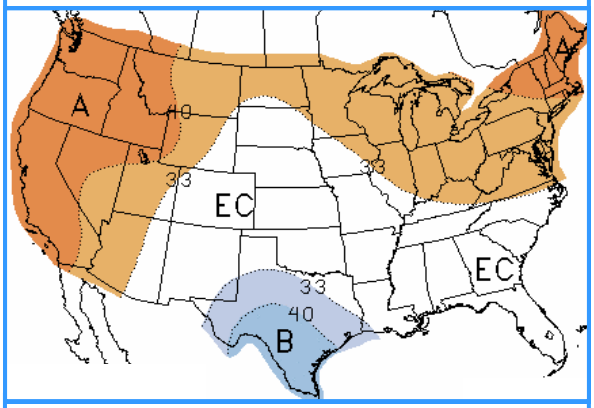
The Spring Outlook from the Climate Prediction Center (released on Jan. 15th) continues the recent trend of forecasting predominantly **Equal Chances** of above normal, below normal, or near normal temperatures and precipitation across South Central Nebraska and North Central Kansas.

Time Frame: The NWS defines the "spring" season as running from March 1 - May 31. Although this is offset roughly three weeks from the astronomical spring season that runs from March 20 - June 20, using these three full months is more convenient for analyzing meteorological data.

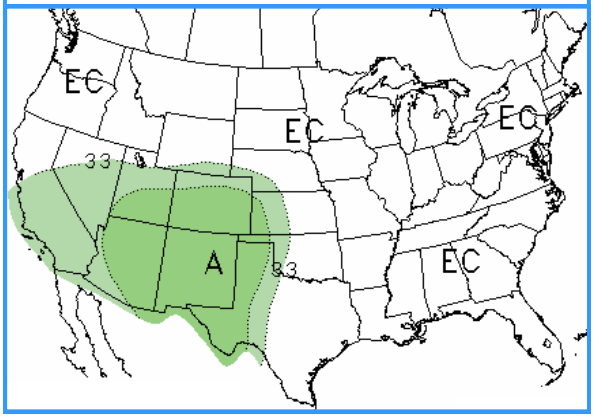
Temperature: The outlook on the right reflects a forecast for the *3-month period as a whole*. We tend to view temperatures in the context of a daily or monthly average, but the 3-month outlook accounts for the entire season. **Red/orange** colors represent "**warmer**" than normal expectations while **Blue** colors represent "**cooler**" than normal. The white area labeled "**EC**" designates regions with Equal Chances of having above, near or below normal temperatures. As the image shows, the local area falls *entirely* within this Equal Chances area. This means that long range forecast tools are currently lacking a strong enough indicator to justify either above or below normal temperature expectations for the season. Stated in a less formal way, temperature trends for the spring season as a whole currently appear to be a "crapshoot".

Precipitation: Similar to temperatures, the precipitation outlook depicts the overall expectation for the entire 3-month period, and is independent of individual days or months. **Green** colors represent an enhanced chance of "**wetter**" than normal conditions while **Orange/brown** colors represent "**drier**" than normal. The white area labeled "**EC**" designates regions with Equal Chances of having above, near or below normal precipitation. According to the graphic, the majority of the local area again resides within the Equal Chances area, with only the slightest hint of above normal precipitation brushing western counties. As is the case with temperatures, most of the area features no clear trend in the forecast analysis to support an expectation of either above or below normal values.

Temperature Outlook for Spring 2015 (March - May)



Precipitation Outlook for Spring 2015 (March - May)



To view these and other Climate Prediction Center outlooks visit http://www.cpc.ncep.noaa.gov/

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«City» «State» «ZIP Code»

Meet the Rest of the Staff at WFO Hastings

Meteorologist-In-Charge

Steve Eddy

Warning Coordination Meteorologist

Mike Moritz

Science and Operations Officer

Rick Ewald

Data Acquisition Program Manager

Marla Doxey

Electronic Systems Analyst

Mark Fairchild

Information Technology Officer

Carol Cartier

Administrative Assistant

Victor Schoenhals

Electronics Technician

Mike Bergmann ● Jesse Wirtes

Meteorological Intern / Hydrometeorological Technicians

Briona Saltzman ● Joe Guerrero / Mike Reed ● Phil Beda

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